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Docket 82651NAB
Customer No. 01333

OIPE IAP52 OCT 06 2005 PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Kurt M. Sanger

LOOKUP TABLE FOR ADJUSTING DOT-GAIN ON BITMAP FILES BASED ON AVERAGE NUMBER OF DOTS

Serial No. 10/645,273

Filed August 21, 2003

Group Art Unit: 2676

Examiner: Richer, Aaron M.

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Tara Piccone

Tara Piccone

10-4-05

Date

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA. 22313-1450

Sir:

APPEAL BRIEF TRANSMITTAL

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. A duplicate copy of this letter is enclosed.

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Respectfully submitted,

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APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.37 and 35 U.S.C. 134

Table Of Contents

APPELLANT'S BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims that was contained in the Office Action mailed June 21, 2005.

A timely Notice of Appeal was filed September 20, 2005.

Real Party In Interest

As indicated above in the caption of the Brief, Eastman Kodak Company is the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

- [x] Claims 1-54 are pending in the application.
- [ ] Claims ______ are cancelled.
- [ ] Claims ______ stand allowed.
- [x] This appeal is directed to Claims 1-54 which all stand finally rejected by the Final Rejection dated September 20, 2005.

Appendix I provides a clean, double-spaced copy of the claims on appeal.

Status of Amendments:

- [x] No amendments were filed subsequent to the Final Rejection.
- [ ] A first amendment was filed subsequent to the Final Rejection. This amendment was denied entry.
- [ ] A first amendment was filed subsequent to the Final Rejection and has been entered.

Summary of Claimed Subject Matter

Halftone binary bitmap files are digitized representations of continuous tone images and are used in digital printers. The present invention relates to proofing a binary halftone bitmap file that is to be imaged onto a printing plate to insure that the tone-scale of the printed image is visually correct. Dot-gain can be thought of as "smearing" of the ink on the receiver. By adjusting the dot-gain of the

binary halftone bitmap files, the resultant proof will more closely match the press sheet.

Referring to Figure 8 of the present application, a halftone bitmap digital file of binary pixels (400) is digitally filtered (200) to generate a weighted sum (406) of the pixels in the digital file (400). This produces a first set (210) of multilevel pixels, which can be thought of as a blurred image.

A threshold level is obtained by again digitally filtering (220) the file of binary pixels (400) to produce a second set of multilevel pixels (230). This second set of multilevel pixels (230) is sampled (505) at a predetermined sampling rate (506), and the sampled multileveled pixels are inputted to a look-up-table whose output is the threshold level for the set of sampled multilevel pixels.

The blurred image, represented by the first set (210) of multilevel pixels, is then converted back into a binary pixel output by comparing the blurred image to the threshold level. This determines how much dot-gain or loss is imparted onto the original file.

Grouping of Claims:

In regards to patentability, the claims stand or fall together for purposes of this appeal.

Grounds of Rejection to be Reviewed on Appeal

The following issues are presented for review by the Board of Patent Appeals and Interferences:

A. Are claims 1, 7-11, 13,15,19,25-29,31,33,37,43-47, 49 and 51 unpatentable under 35 U.S.C. 103(a) as being obvious over Bresler et al. 6,115,140 in view of Lin et al 5,553,171 and Dohnomae 6,072,588?

B. Are claims 2-6, 20-24 and 38-42 unpatentable under 35 U.S.C. 103(a) as being obvious over Bresler et al. 6,115,140 in view of Lin et al 5,553,171; Dohnomae 6,072,588; and Fan 5,339,170?

C. Are claims 12, 14, 16-18, 30, 32, 34-36, 48, 50 and 52-54 unpatentable under 35 U.S.C. 103(a) as being obvious over Bresler et al. 6,115,140 in view of Lin et al 5,553,171; Dohnomae 6,072,588; and Eschbach 5,208,871?

Arguments

The Final Office Action rejects all pending claims over various combinations of references. In each combination, Bresler et al. is the primary reference.

Bresler et al. uses a de-screened version of an original image, and dilated and eroded versions of the original image to select a combination of the original, dilated, and eroded images to effect a dot-gain or tone-scale change in an input bitmap image. Figure 5A and the text in Col. 12, lines 3-35 of Bresler et al. detail a process for obtaining inputs to an image merging operation (block 250), resulting in an output halftone image HO (block 290). These inputs are:

1. the original halftone image HI (block 100),
2. an eroded halftone image HE (block 150),
3. a first dilated halftone image HD1 (block 160),
4. a second dilated halftone image HD2 (block 220),
5. a color corrected first continuous tone image CI (block 140),
6. an eroded second continuous tone image CE (block 200),
7. a dilated third continuous tone image CD1 (block 210),
8. a dilated fourth continuous tone image CD2 (block 240), and
9. a weight-based, descreened and color-converted version CO or the original continuous tone image (block 260).

In Bresler et al., dilation is described as growing a single pixel completely around the halftone feature. A second dilation grows two pixels completely around the halftone feature. Similarly, erosion subtracts a single pixel completely around the halftone feature.

Figure 5B of Bresler et al., illustrates the merging operation of block 250 of Figure 5A. A weight is calculated based on de-screened versions of the original halftone (CO), the color corrected original (CI), the eroded original (CE), and the two dilated originals (CD1 and CD2). The de-screened images are used to select which of the four halftone images, HI, HE, HD1, and HD2, are transferred into H1 (block 310) and H2 (block 320). The weighting function is then used to merge bitmap versions of H1 and H2 together into the tone-scaled output bitmap HO (block

290). How descreening is accomplished is not disclosed, nor exactly how to calculate which bit of H1 and H2 is used to drive the output bit HO.

Bresler et al. has at least two continuous tone images. One is from the original image and the other is of a dilated image. Bresler et al. Figure 5b shows a continuous tone image of the original CO (block 260), a continuous tone image with the desired level CI (block 140), a continuous tone eroded image CE (block 200), a continuous tone dilated image CD1 (block 210), and a continuous tone dilated image CD2 (block 240). Whichever of those images is closest to a desired continuous level is used to select which bitmap image to use. For example, if an original continuous tone image has a density level of, say, 128 and the user CI to be a level of 140, if the dilated image CD1 has a level of 145 and CD2 has a level of 155, then the halftone bitmap HD1 would be selected over the original image to set the output for that pixel.

According to Claim 1 of the present application, a halftone bitmap digital file of binary pixels (400) of an original image is digitally filtered (200). The filtering generates a weighted sum (406) of the pixels in the digital file (400). This produces a first set (210) of multilevel pixels, which can be thought of as a blurred image.

A threshold level is obtained by again digitally filtering (220) the file of binary pixels (400) to produce a second set of multilevel pixels (230). This second set of multilevel pixels (230) is sampled (505) at a predetermined sampling rate (506), and the sampled multileveled pixels are inputted to a look-up-table whose output is the threshold level for the set of sampled multilevel pixels. Sampling (505) the filtered (220) set of binary pixels (400) using an averaging or blur filter is referred to in the art as "descreening". Using a continuous tone image as a threshold with a two-dimensional screen threshold array containing a digital screen is referred to in the art as "screening". The digital screen may be a periodic screen commonly referred to as an area modulated center weighted halftone, or an aperiodic screen also referred to as a frequency modulated or stochastic screen.

Referring to step (f) of Claim 1, the blurred image, represented by the first set (210) of multilevel pixels, is then converted back into a binary pixel output by comparing the blurred image to the threshold level. This determines how much dot-gain or loss is imparted onto the original file. Unlike conventional screening, the invention does not use a two-dimensional screen threshold array containing a known

screen. Instead the invention uses the blurred continuous tone image (210) of the original (400) to provide the original screen information. The prior art cited by the Examiner does not teach to use a blurred halftone image as a two-dimensional screen threshold array to screen an image.

A good example of where the present invention as defined in Claim 1 departs from Bresler et al. is in this just-described step (f) of Claim 1. While Bresler et al. selects between different dilated and original halftone images dependant upon a comparison of their descreened continuous tone levels, the present invention filters and subsamples the original halftone image (similar to descreening), uses a lookup table with the subsampled image to calculate a threshold level, (similar to adding dot gain), then uses the threshold level with a blurred continuous tone image of the original halftone (similar to screening however the blurred continuous tone image of the original halftone is used as the two-dimensional screen threshold array).

The Examiner's statement of what is disclosed by the cited references does not reflect an understanding of what is claimed. As set forth above, the primary reference fails to disclose filtering a half tone image and uses the filtering result to determine, by thresholding, how much dot-gain or loss is imparted onto the original file. The secondary references fail to disclose, in conceptual terms, the information undisclosed by the primary reference. Assuming arguendo that the references might be capable of combination, there is at least one limitation in the claimed invention that is not disclosed by the references individually or in combination. "Each element of a claim is material." *Ashland Oil,* Inc. v. *Delta Resins & Refractories, Inc.,* 227 USPQ 657,666 (Fed. Cir., 1985)

Step (f) of independent Claim 19 and step (f) of independent Claim 37 provide a basis for patentablility similar to step (f) of Claim 1. Claims 2-18, 20-36, and 38-54 depend directly or indirectly from one of independent Claims 1, 19 and 37, and are allowable therewith.

Conclusion

1. The claims define apparatus that is not rendered obvious by the references of record based on a proper application of 35 U.S.C. 103.

2. Bresler et al. column 2 line 59 through column 3 line 9 describes the difficulties in adjusting color of a halftone bitmap file using descreening DS Step,

addition of gain called color conversion CS Step, and screening S Step. The invention eliminates the drawbacks identified by Bresler et al. by using a blurred continuous tone version of the original image in the thresholding (screening) step thereby utilizing the exact screening information of the original halftone. This is a simpler and more elegant solution that was not anticipated by the prior art.

3. Using dilation to adjust color will increase the contrast in the output image, as pixels will be added around the circumference of each feature in the input halftone. Using a blurred continuous tone image of the original halftone allows for fewer pixels to be added to each halftone feature resulting in a more pleasing output.

4. The rejections of the claims are based on improper reading of the disclosure of the references.

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims .

Respectfully submitted,

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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

Appendix - Claims on Appeal

1. (previously presented) A method for adjusting dot-gain for a halftone binary bitmap file comprising the steps of:

(a) inputting a halftone binary bitmap file comprising binary pixels to a digital filter;

(b) filtering the binary pixels with the digital filter generating a weighted sum of the binary pixels producing a first set of multilevel pixels;

(c) filtering the binary pixels with a second digital filter producing a second set of multilevel pixels;

(d) sampling the second set of multilevel pixels at a preset sample rate identifying a set of sampled multilevel pixels;

(e) inputting the set of sampled multilevel pixels to a lookup table to create an output that is a threshold level for the set of sampled multilevel pixels;

(f) using the first multilevel pixels and comparing to the threshold level for the set of sampled multilevel pixels and generating a binary pixel output;

(g) collecting the binary output and forming an adjusted halftone binary bitmap; and

(h) passing the adjusted halftone binary bitmap directly to a proofing system.

2. (original) The method of claim 1, wherein the first digital filter is a blur filter, an edge enhancement filter, an averager filter, a high pass filter, a low pass filter, or a band pass filter.

3. (original) The method of claim 1, wherein the first digital filter is a horizontal filter, a vertical filter or a combination of at least one vertical filter and at least one horizontal filter.

4. (original) The method of claim 1, wherein the second digital filter is a horizontal filter, a vertical filter or a combination of at least one vertical filter and at least one horizontal filter.

5. (original) The method of claim 1, wherein the second digital filter is an averager filter.

6. (original) The method of claim 1, wherein the second digital filter is a low pass filter.

7. (original) The method of claim 1, wherein the halftone binary bitmap file is generated by a raster image processor.

8. (original) The method of claim 1, wherein the halftone binary bitmap file is generated from a high resolution scan of a halftone film.

9. (original) The method of claim 1, wherein the halftone binary bitmap file has a resolution of between 600 dpi and 6000 dpi.

10. (original) The method of claim 9, wherein the halftone binary bitmap file has a resolution of between 1800 dpi and 3000 dpi.

11. (original) The method of claim 1, wherein the lookup table is determined by the color separation that the halftone binary bitmap file represents.

12. (original) The method of claim 1, further comprising the step of processing the halftone binary bitmap file at a specific screen ruling and a specific screen angle.

13. (original) The method of claim 1, wherein the lookup table is determined by a halftone binary bitmap file screen ruling.

14. (original) The method of claim 1, wherein the lookup table is determined by a halftone binary bitmap file screen angle.

15. (original) The method of claim 1, wherein the preset sample rate is determined by a screen ruling of the halftone binary bitmap file.

16. (original) The method of claim 1, wherein the preset sample rate is determined by a screen angle of the halftone binary bitmap file.

17. (original) The method of claim 1, wherein the preset sample rate is determined by a screen angle and a screen ruling of the halftone binary bitmap file.

18. (original) The method of claim 1, wherein the preset sample rate is determined using a halftone bitmap screen ruling and a halftone bitmap screen angle.

19. (previously presented) A method for adjusting dot-gain for a halftone binary print comprising the steps of:

(a) inputting a halftone binary bitmap file comprising binary pixels to a digital filter;

(b) filtering the binary pixels with the digital filter generating a weighted sum of the binary pixels producing a first multilevel pixel;

(c) filtering the binary pixels with a second digital filter producing a second multilevel pixel;

(d) sampling a plurality of second multilevel pixels at a preset sample rate identifying sampled multilevel pixels;

(e) inputting the sampled multilevel pixels to a lookup table to create an output that is a threshold level for the sampled multilevel pixels;

(f) using a plurality of first multilevel pixels and comparing the plurality of first multilevel pixels to the threshold level for the sampled multilevel pixels and generating a binary pixel output;

(g) collecting the binary pixel output and forming an adjusted halftone binary bitmap;

(h) passing the adjusted halftone binary bitmap directly to a proofing system; and

(i) printing the adjusted halftone binary bitmap.

20. (original) The method of claim 19, wherein the first digital filter is a blur filter, an edge enhancement filter, an averager filter, a high pass filter, a low pass filter, or a band pass filter.

21. (original) The method of claim 19, wherein the first digital filter is horizontal filter, a vertical filter or a combination of at least one vertical filter and at least one horizontal filter.

22. (original) The method of claim 19, wherein the second digital filter is a horizontal filter, a vertical filter or a combination of at least one vertical filter and at least one horizontal filter.

23. (original) The method of claim 19, wherein the second digital filter is an averager filter.

24. (original) The method of claim 19, wherein the second digital filter is a low pass filter.

25. (original) The method of claim 19, wherein the halftone binary bitmap file is generated by a raster image processor.

26. (original) The method of claim 19, wherein the halftone binary bitmap file is generated from a high resolution scan of a halftone film.

27. (original) The method of claim 19, wherein the halftone binary bitmap file has a resolution of between 600 dpi and 6000 dpi.

28. (original) The method of claim 27, wherein the halftone binary bitmap file has a resolution of between 1800 dpi and 3000 dpi.

29. (original) The method of claim 19, wherein the lookup table is determined by the color separation that the halftone binary bitmap file represents.

30. (original) The method of claim 19, further comprising the step of processing the halftone binary bitmap file at a specific screen ruling and a specific screen angle.

31. (original) The method of claim 19, wherein the lookup table is determined by a halftone binary bitmap file screen ruling.

32. (original) The method of claim 19, wherein the lookup table is determined by a halftone binary bitmap file screen angle.

33. (original) The method of claim 19, wherein the preset sample rate is determined by a screen ruling of the halftone binary bitmap file.

34. (original) The method of claim 19, wherein the preset sample rate is determined by a screen angle of the halftone binary bitmap file.

35. (original) The method of claim 19, wherein the preset sample rate is determined by a screen angle and a screen ruling of the halftone binary bitmap file.

36. (original) The method of claim 19, wherein the preset sample rate is determined by a halftone bitmap file screen ruling and a halftone binary bitmap file screen angle.

37. (previously presented) A method for adjusting dot-gain for a printing plate comprising the steps of:

(a) inputting a halftone binary bitmap file comprising binary pixels to a digital filter;

(b) filtering the binary pixels with the digital filter generating a weighted sum of the binary pixels producing a multilevel pixel;

(c) filtering the binary pixels with a second digital filter producing a second multilevel pixel;

(d) sampling a plurality of second multilevel pixels at a preset sample rate identifying sampled multilevel pixels;

(e) inputting the sampled multilevel pixels to a lookup table to create an output that is a threshold level for the sampled multilevel pixels;

(f) using a plurality of first multilevel pixels and comparing the plurality of first multilevel pixels to the threshold level for the sampled multilevel pixels and generating a binary pixel output;

(g) collecting the binary output and forming an adjusted halftone binary bitmap;

(h) passing the adjusted halftone binary bitmap directly to a proofing system; and

(i) exposing a printing plate to the adjusted halftone binary bitmap.

38. (original) The method of claim 37, wherein the first digital filter is a blur filter, an edge enhancement filter, an averager filter, a high pass filter, a low pass filter, or a band pass filter.

39. (original) The method of claim 37, wherein the first digital filter is a horizontal filter, a vertical filter or a combination of at least one vertical filter and at least one horizontal filter.

40. (original) The method of claim 37, wherein the second digital filter is a horizontal filter, a vertical filter or a combination of at least one vertical filter and at least one horizontal filter.

41. (original) The method of claim 37, wherein the second digital filter is an averager filter.

42. (original) The method of claim 37, wherein the second digital filter is a low pass filter.

43. (original) The method of claim 37, wherein the halftone binary bitmap file is generated by a raster image processor.

44. (original) The method of claim 37, wherein the halftone binary bitmap file is generated from a high resolution scan of a halftone film.

45. (original) The method of claim 37, wherein the halftone binary bitmap file has a resolution of between 600 dpi and 6000 dpi.

46. (original) The method of claim 45, wherein the halftone binary bitmap file has a resolution of between 1800 dpi and 3000 dpi.

47. (original) The method of claim 37, wherein the lookup table is determined by the color separation that the halftone binary bitmap file represents.

48. (original) The method of claim 37, further comprising the step of processing the halftone binary bitmap file at a specific screen ruling and a specific screen angle.

49. (original) The method of claim 37, wherein the lookup table is determined by a halftone binary bitmap file screen ruling.

50. (original) The method of claim 37, wherein the lookup table is determined by a halftone binary bitmap file screen angle.

51. (original) The method of claim 37, wherein the preset sample rate is determined by a screen ruling of the halftone binary bitmap file.

52. (original) The method of claim 37, wherein the preset sample rate is determined by a screen angle of the halftone binary bitmap file.

53. (original) The method of claim 37, wherein the preset sample rate is determined by a screen angle and a screen ruling of the halftone binary bitmap file.

54. (original) The method of claim 37, wherein the preset sample rate is determined by a halftone bitmap file screen ruling and a halftone binary bitmap file screen angle.